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EXAMINER

LERNER, MARTIN

ART UNIT

PAPER NUMBER

2654

DATE MAILED: 12/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/036,747	KLEIJN, W. BASTIAAN	
	Examiner	Art Unit	
	Martin Lerner	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1 to 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1 to 29 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>8 April 2002</u> .	6) <input type="checkbox"/> Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 to 9, 11 to 19, and 21 to 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Ozawa.

Regarding independent claim 1, Ozawa discloses a method of postfiltering a signal, comprising:

“receiving a distorted input signal that includes an embedded corrupting signal, wherein the embedded corrupting signal is statistically related to the undistorted sound signal” – signal $S(n)$ is a distorted input signal, in that it has a noise components (column 5, lines 54 to 64: Figure 1); statistical properties of the signal are properties of the input signal, and not of the invention *per se*; implicitly, there are generally components of the noise that are related to the signal, as admitted by the Specification,

Page 4, Lines 25 to 34;

“determining an enhancement signal by finding a difference between the distorted input signal and the enhanced output signal, whereby the enhancement signal attempts to offset the embedded corrupting signal” – $S(n)$ is the distorted input signal

and $y(n)$ is the enhanced output signal; an enhancement signal as a difference is represented by the summation terms on the right hand side of Equation (12) (column 5, lines 54 to 64: Figure 1); the enhancement signal, represented by the summation terms on the right hand side of Equation (12), is a filtering operation for spectrum postfilter 20, which filters the distorted input signal $S(n)$ to improve sound quality (“to offset the embedded corrupting signal”), based upon linear prediction coefficients a_i and c_i (column 5, lines 31 to 59: Figure 1);

“analyzing the enhancement signal” – compensation filter coefficient calculation circuit 35 receives linear prediction coefficients a_i and c_i of enhancement signal and outputs a compensation coefficient q_i (column 5, line 65 to column 6, line 10: Figures 1 and 3);

“producing the enhanced output signal, based at least in part upon the analyzing step” – compensation filter 30 generates a transfer function for enhancing enhanced output signal $y(n)$ by adaptively eliminating spectrum tilt to produce an additionally enhanced output signal $g(n)$, where output signal $g(n)$ is calculated based upon compensation coefficients q_i , which in turn were based upon linear prediction coefficients a_i and c_i from compensation filter coefficient calculation circuit 35 (column 6, lines 29 to 58: Figure 1).

Regarding independent claim 13, Ozawa discloses a method of postfiltering a signal, comprising:

“receiving a distorted input signal that includes an embedded corrupting signal, wherein the embedded corrupting signal is statistically related to the undistorted sound signal” – signal $S(n)$ is a distorted input signal, in that it has a noise components (column 5, lines 54 to 64: Figure 1); statistical properties of the signal are properties of the input signal, and not of the invention *per se*; implicitly, there are generally components of the noise that are related to the signal, as admitted by the Specification,

Page 4, Lines 25 to 34;

“estimating a first iteration enhanced output signal” – $S(n)$ is the distorted input signal and $y(n)$ is the enhanced output signal (column 5, lines 54 to 64: Figure 1); output signal $y(n)$ represents “a first iteration enhanced output signal” in the sense that each of filters 20, 30, and 40 are further refinements of a desired output signal;

“determining a first iteration enhancement signal by finding a difference between the distorted input signal and the first iteration enhanced output signal” – an enhancement signal as a difference is represented by the summation terms on the right hand side of Equation (12) (column 5, lines 54 to 64: Figure 1); the enhancement signal, represented by the summation terms on the right hand side of Equation (12), is a filtering operation for spectrum postfilter 20, which filters the distorted input signal $S(n)$ to improve sound quality based upon linear prediction coefficients a_i and c_i (column 5, lines 31 to 59: Figure 1);

“analyzing the first iteration enhancement signal” – compensation filter coefficient calculation circuit 35 receives linear prediction coefficients a_i and c_i of enhancement

signal and outputs a compensation coefficient q_i (column 5, line 65 to column 6, line 10: Figures 1 and 3);

“producing a second iteration enhanced output signal, based at least in part upon the analyzing step” – compensation filter 30 generates a transfer function for enhancing enhanced output signal $y(n)$ (“producing a second iteration enhanced output signal”) by adaptively eliminating spectrum tilt to produce an additionally enhanced output signal $g(n)$, where output signal $g(n)$ is calculated based upon compensation coefficients q_i , which in turn were based upon linear prediction coefficients a_i and c_i from compensation filter coefficient calculation circuit 35 (column 6, lines 29 to 58: Figure 1); output signal $g(n)$ represents “a second iteration enhanced output signal” in the sense that each of filters 20, 30, and 40 are further refinements of a desired output signal.

Regarding independent claim 24, Ozawa discloses an apparatus for postfiltering a signal, comprising:

“an enhancement circuit that receives the distorted input signal and produces a first iteration enhanced output signal” – spectrum postfilter 20, which filters the distorted input signal $S(n)$ to improve sound quality based upon linear prediction coefficients a_i and c_i (column 5, lines 31 to 59: Figure 1); $S(n)$ is the distorted input signal and $y(n)$ is the enhanced output signal (column 5, lines 54 to 64: Figure 1); spectrum postfilter “produces a first iteration enhanced output signal” in the sense that each of filters 20, 30, and 40 are further refinements of desired output signals $y(n)$ and $g(n)$;

“a feedback circuit that uses the first iteration enhanced output signal to effect production of a second iteration enhanced output signal by the enhancement circuit” – compensation filter 30 generates a transfer function for enhancing enhanced output signal $y(n)$ (“producing a second iteration enhanced output signal”) by adaptively eliminating spectrum tilt to produce an additionally enhanced output signal $g(n)$ (column 6, lines 29 to 58: Figure 1); output signal $g(n)$ represents “a second iteration enhanced output signal” in the sense that each of filters 20, 30, and 40 are further refinements of desired output signals $y(n)$ and $g(n)$;

“an output circuit that produces the enhanced output signal upon completion of at least one iteration cycle” – gain adjustment circuit 40 adjusts the gain after spectrum postfilter 20 and compensation filter 30 iteratively improve the output signal; gain adjustment circuit 40 produces a further enhanced output signal (column 6, lines 59 to 61: Figure 1).

Regarding claims 2, 14, and 25, Ozawa discloses:

“the analyzing step comprises a step of determining a set of parameters from the enhancement signal” – compensation filter coefficient calculation circuit 35 receives linear prediction coefficients a_i and c_i (“a set of parameters”) of the enhancement signal and outputs a compensation coefficient q_i (column 6, lines 11 to 15: Figures 1 and 3);

“the set includes a power of the enhancement signal, determined over a finite-support window” – an autocorrelation function calculation circuit 352 calculates an autocorrelation function $R(m)$, which is the power of the impulse response $h_w(n)$;

impulse response $h_w(n)$ is a filter for producing the enhanced signal (column 6, lines 16 to 29: Equation (13): Figure 3); the autocorrelation function $R(m)$ is taken for a set sampling number Q, where Q is 20 or 40 (column 6, lines 11 to 15: Figure 3); thus, sampling number Q represents “a finite-support window” of samples.

Regarding claims 3 and 15, Ozawa discloses gain adjustment circuit 40 adjusts a gain to equal power of the reproduced signal $S(n)$ (“the power constrained by characteristics of the distorted input signal”) (column 6, lines 59 to 61: Figure 1).

Regarding claims 4, 6, 16, 18, and 27, Ozawa discloses optionally adding a pitch postfilter (column 7, lines 32 to 39); a pitch postfilter increases a pitch component of an output signal, or increases the periodicity.

Regarding claims 5 and 17, Ozawa discloses:

“the analyzing step comprises a step of determining a set of parameters from the enhancement signal” – an autocorrelation function calculation circuit 352 calculates an autocorrelation function $R(m)$, which is the power of the impulse response $h_w(n)$ (column 6, lines 16 to 29: Equation (13): Figure 3);

“possible values for at least some of the set are constrained by characteristics of the distorted input signal” – gain adjustment circuit 40 adjusts a gain to equal power of the reproduced signal $S(n)$ (“the power constrained by characteristics of the distorted input signal”) (column 6, lines 59 to 61: Figure 1).

Regarding claim 7, Ozawa discloses compensation filter 30, which acts as “feeding-back” an enhanced output signal $y(n)$ to provide an additionally enhanced output signal $g(n)$ (column 5, line 65 to column 6, line 58: Figure 1).

Regarding claims 8 and 26, Ozawa discloses gain adjustment circuit 40 adjusts a gain to equal power of the reproduced signal $S(n)$ ("possible values for the power is constrained") (column 6, lines 59 to 61: Figure 1); gain adjustment circuit 40 is an additional iteration for iteratively enhancing an output signal.

Regarding claims 9 and 19, Ozawa discloses the autocorrelation function $R(m)$ is taken for a set sampling number Q , where Q is 20 or 40, for $n = 0$ to $Q - 1 - m$ (column 6, lines 11 to 15: Figure 3); thus, Q represents a number of samples taken forward in time from time $n = 0$.

Regarding claims 11, 21, and 28, Ozawa discloses noise is quantization noise, which is produced by encoding a voice signal ("an artifact of encoding and decoding") (column 1, lines 14 to 25).

Regarding claims 12 and 23, Ozawa discloses a method for calculating transfer functions of spectrum postfilter 20, compensation filter 30, and gain adjustment circuit 40 for enhancing an output signal (Figure 1), which calculations are implicitly performed as instructions on a processor.

Regarding claims 22 and 29, Ozawa discloses spectrum postfilter 20, compensation filter 30, and gain adjustment circuit 40 for enhancing an output signal operate on identical signal portions (Figure 1).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of *Bialik et al.*

Ozawa suggests autocorrelation function $R(m)$ is taken for a set sampling number Q, where Q is 20 or 40, for $n = 0$ to $Q - 1 - m$. (Column 6, Lines 11 to 15: Figure 3) Thus, Q represents a number of samples taken forward in time from time $n = 0$. However, Ozawa omits determining an amount of backward-in-time sample-sequences. *Bialik et al.* teaches a pitch postfilter, where samples are taken from present frame buffer 25 and prior frame buffer 26. Data can be taken from previous subframes 20d, 20c, and 20b, and from future subframes 20e, 20f, and 20g. (Column 2, Line 65 to Column 3, Line 11: Figure 2) The objective is to provide a pitch postfilter that utilizes future and past information for at least some of the subframes to improve performance. (Column 1, Lines 31 to 49) It would have been obvious to one having ordinary skill in the art to take both backward-in-time sample-sequences and forward-in-time sample-sequences as taught by *Bialik et al.* in the postfiltering method of Ozawa for the purpose of providing better performance by utilizing future and past information for a pitch postfilter.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-

9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ML
12/8/04



Martin Lerner
Examiner
Group Art Unit 2654